MONTHLY WEATHER REVIEW,

AUGUST, 1875.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In the compilation of this Review, besides the regular reports from the Signal Service, U. S. Army, Stations and telegraphic reports from the Canadian Stations, there have been examined monthly meteorological records from forty-eight (48) U. S. Army Post Surgeons, forwarded by the Surgeon General, and from two hundred and sixty-six (266) Volunteer Observers; also miscellaneous data.

The most noticeable features for the month are: first, the comparatively small number of areas of low and high barometer that could be traced; second, the heavy rain-falls and destructive floods in New Jersey, Massachusetts, Connecticut, Ohio, Indiana, and Illinois; third, the generally low mean temperature; fourth, the frequency of thunder storms.

ATMOSPHERIC PRESSURE.

Chart No. II shows the general distribution of the atmospheric pressure, for the month, by the isobarometric lines in black. It will be observed that it is greatest along the coast from Florida to Nova Scotia. and least in the Northwest. When compared with August, 1873, the pressure is generally less. It is somewhat greater than for August, 1874, in the Southern States, Middle Atlantic States, New England and Lower Missouri valley, but decidedly less in the Lake region and Minnesota. The latter fact is due to two causes: first, that but two decided high pressure areas crossed those sections; second, that the low pressure areas generally affected the same districts. On the Pacific coast the pressure has been normal; at the Rocky Mountain stations, slightly below the mean, except at Fort Benton, Montana, where it was slightly above.

(1.) *Areas of High Barometer.*—During the month but two areas of high barometer have crossed the country, an unusually small number for August. They were extensive and well-defined, and had a marked effect upon the weather—especially in the northern half of the country east of the Rocky Mountains, where cool, northerly and easterly winds were experienced, with frequent and heavy rains.

No. I. By reference to the Weather Review for July, it will be seen that, at the close of that month, an area of high barometer had been felt over the Northwest and the Upper Lake region, in connection with an area of low barometer moving eastward over Missouri. This high pressure gradually extended over the Lower Lake region, Middle States and New England, on the 1st and 2d, producing cool weather in those sections, and, in connection with low barometer No. I, which, under its influence, moved very slowly, the heavy and continued rains from the Gulf and South Atlantic States to Missouri, the Lakes, Middle States and New England, except in portions of Tennessee and Kentucky. It disappeared to the eastward of Nova Scotia and New Brunswick on the

4th. The slow progress of low barometer No. I, as well as its eastward course from Missouri to northern Kentucky, and thence northeastward over the Lower Lakes into Canada, were due to this high pressure area.

No. II. On the afternoon of the 20th its approach was indicated by a decided rise in the barometers at Fort Garry, Manitoba, and Pembina. During the night the temperature fell to 31° at the former station and to 28° at the latter. It extended itself over the Upper Lake region on the 21st, with temperatures sufficiently low to produce destructive frosts from eastern Dakota and northern Iowa to Michigan, that night. On the 22d, 23d, and 24th, it passed over the Lower Lake region to the Middle and Eastern States. The winds along the coast from the Carolinas to southern New England shifted to northeasterly, with rain, which at many places was heavy, while the former increased to very brisk and high from New Jersey to Cape Hatteras. Frosts were reported from the northern portions of New York and New England. Cool weather continued in the Middle and Eastern States from the 22d to the 28th, after which this area gradually disappeared under the influence of falling barometer in the Northwestern States.

(2.) *Areas of Low Barometer.*—Of these, only seven well-defined depressions have moved within the limits of the stations, a smaller number than usual for the month of August, the paths of the centres of which have been traced, and are shown upon Chart No I. The four first were quite decided, and much more so than the others It will be seen that all of them disappeared over the Lake region into Canada, which is also unusual. Several of them were felt in the St. Lawrence valley, but passed so far to the northward of the same as to render the location of their tracks very uncertain.

No. I. This is a continuation of the low barometer designated as No. VIII, for the month of July, and is decidedly interesting on account of the conditions which prevailed, the effect they had upon its movement, and the weather resulting therefrom. On the 1st, warm southerly winds, veering to westerly, and frequent thunder-storms prevailed in the Southern States. High barometer continued in the Lake region, and gradually extended itself southeastward towards the Middle and Eastern States, with low temperatures and northerly to easterly winds, which increased to severe gales over the western portion of Lake Erie, where the barometric gradient was steep. The wind reached the velocity of forty-five miles per hour at Toledo. Heavy rains fell from Kentucky and Illinois to Lake Erie; at Indianapolis 3.85 inches in eight hours. On the 2nd, the high barometer moved over New England, permitting this low pressure to take a northeastward course. The northeasterly gales continued on the western portion of Lake Erie, and commenced on the Middle Atlantic and New England coasts. The heavy rains gradually extended eastward over the Middle States to southern New England. At Washington, D. C, 2.00 inches fell in eight hours. Southerly gales were reported from eastern North Carolina. During the 3rd, decided changes took place. Both the high and low pressure-areas commenced to lose their distinctive features, and the winds diminished in force. Rainy weather prevailed in the Middle and Eastern States, followed by clearing weather in the former at night. At Albany, 1.00 inch of rain fell in less than eight hours; at Oswego, 1.05 inches; at Long Branch, 1.15 inches; at Boston, 1.55 inches. On the 4th, occasional showers passed in New England and the eastern portion of the Middle States. The heavy rains in Missouri, southeastern Iowa, Illinois, Indiana, Ohio, West Virginia, and western Pennsylvania, from July 31st to August 2nd, were not only very destructive to the crops, but also caused the streams to overflow their banks, and wash away houses, bridges, grain, railroads, &c, The Monongahela river was above the "danger line" on the 1st, 2nd and 3rd. The Ohio reached the "danger line," at Pittsburgh, on the 3rd; at Marietta, the

2nd; at Cincinnati, the 3rd; at Louisville, the 4th; at Evansville during July, and its highest point on the 9th instant; at Paducah, the 12th.

No. II. Diminishing pressure in the Northwest on the 4th indicated the approach of some disturbance, while severe and destructive hail-storms occurred in eastern Nebraska. The morning of the 5th, it had advanced so that its center could be located in southern Minnesota. By midnight it had reached the eastern shore of Lake Michigan, having moved southeastward very rapidly, and, consequently, produced frequent and heavy squalls. Gales were reported from Lakes Michigan and Superior. Heavy showers of rain occurred in Minnesota and the Upper Lake region. On the 6th, the center took a northeastward course to Georgian Bay. South to west gales prevailed on Lakes Michigan, Erie and Huron, to the south of its path, and northeast to northwest gales to the north of it on Lakes Huron, Michigan and Superior. Heavy showers of rain fell, the largest amounts in eight hours having been at Escanaba, 1.01 inches; at Marquette, 1.09 inches; at Buffalo, 1.37 inches; at Oswego, 1.48 inches; at Erie, 1.65 inches; at Rochester, 1.77 inches. Terrific and destructive thunder-storms accompanied it in Illinois, Indiana, southern Michigan, Ohio, Kentucky and Tennessee. The highest wind velocities were reported from Grand Haven, west, forty miles per hour; at Escanaba, north, thirty-two miles; and at Long Branch, southwest, forty-five miles. It disappeared into Canada on the 7th. As the storm approached the lake region the barometric readings grew less and the gradients steeper.

The lowest barometric reading, (29.329 inches,) was reported from Alpena, Mich., on the morning of the 6th.

No. III, as will be seen by the chart, made its appearance in Dakota, passing thence into Iowa on the 9th. So far as known, dangerous winds were not experienced thus far, and generally light showers of rain fell from Wisconsin and Iowa westward. During the 10th, the rains extended eastward to Lake Huron and Ohio, with occasional, heavy thunder-storms in the Southern States. Heretofore, its progress had been southeastward, but on the 11th it took a nearly due north course over Michigan into Canada. Frequent and severe thunder-storms continued in the Southern States, and extended to the Middle States. Light rains fell in the Lower Lake region, and very heavy rains in the Upper Lake region. At Marquette, 2.85 inches, and at Escanaba, Mich., 3.59 inches were recorded within twenty-four hours. On the 12th it slowly disappeared. Heavy rains continued on the eastern Gulf coast and in the Middle States, but generally light rains in New England. In Essex and Passaic counties, N. J., tornadoes are reported as having occurred, with heavy rains, on the 11th, causing very rapid and destructive rises in the rivers.

No. IV pursued a nearly due east course from Dakota over the Upper Lake region into Canada. Occasional rains resulted therefrom in the Northwest on the 14th, which became general, and, at places, heavy in the Upper Lake region. At the same time a minor depression advanced eastward over Texas, producing heavy rains. At Corsicana 3.88 inches fell within eight hours; at Shreveport, 1.29 inches; at Vicksburg, 1.54 inches. These two gradually combined to form a secondary depression, which, on the morning of the 18th. was central over Pennsylvania. Up to that date frequent and heavy thunder-storms prevailed in the Southern and Middle States, and hail occasionally accompanied them. On the 18th and 19th it slowly disappeared to the northeastward over and beyond the St. Lawrence valley. Dangerous winds were reported as having accompanied thunder-storms along the New Jersey and southern New England coasts on the 18th, while in the western portions of Connecticut and Massachusetts, and the southeastern portion of New York, unusually heavy rains fell. At Springfield, 2.80 inches in less than

eight hours; at Hartford, 3.10 inches in about an hour; causing creeks and rivers to overflow their banks, and destroying an immense amount of property.

No. V reached the Upper Lake region from Manitoba, and disappeared northeastward into Canada. It was felt principally in the first section and eastern Minnesota, where high north and northwest winds, and occasional hail and heavy rains, occurred on the 20th. At Escanaba, Mich., the wind attained a velocity of forty-four miles per hour. On the 21st, a severe thunder-storm and gale of wind prevailed in northern Indiana during the afternoon; also numerous rains in the Lower Lake region. Its sudden disappearance was no doubt due to high barometer No. II, which followed it quite rapidly on the 21st. A destructive whirlwind resulted near Albany, N. Y., on the 22d.

No. VI. Following high barometer No. II, the pressure diminished quite rapidly on the 23d and 24th from the upper Mississippi valley westward, with rising temperature, south to east winds, increasing to brisk and high, increasing cloudiness and rain-areas, from Nebraska to Dakota and Minnesota. Thus far it had pursued a southeastwardly course, but on the 25th and 26th was forced to take a northeastward course, as shown on the chart, under the influence of the high pressure prevailing over the country to the east and southeast of it. Severe rain, wind and thunder-storms are reported as having accompanied it from Kansas and western Missouri to Dakota, Minnesota and the western portion of Lake Superior.

No. VII. This depression succeeded the previous one on the 27th, and also moved northeastward from Dakota beyond the limit of the stations on the 28th. From Kansas and Missouri northward over Dakota, Minnesota and the western portion of Lake Superior, frequent and violent thunder-storms accompanied it.

On the 29th, 30th and 31st, the pressure diminished in the extreme Northwest, with brisk and high south to east winds, high temperature and numerous severe thunder-storms. At St. Paul 2.05 inches of rain fell within eight hours; at La Crosse 1.32 inches.

(3.) *Local Storms*—A cyclone struck about two miles east of Somonauk, Ill., at 7:20 P. M., on the 5th inst., and passed through Sandwich, doing considerable damage. Thence it took a northeastward course, damaging corn-fields, fences, &c. On the same date, in Palmyra township, Lee county, Ill., a hurricane demolished wind-mills and prostrated trees, fences, &c. In the adjacent counties of Carroll and Whiteside, barns were destroyed. North of Galesburg, Ill., a disastrous tornado occurred on the same date, demolishing twenty-five farm-houses and destroying all the crops in its course. It passed over Wataga, where it also did considerable damage. Its path was from one-fourth to one-half of a mile in width. During the morning of the 6th, a severe thunder-storm occurred at McMinnville, Tenn. The wind was from the southwest and suddenly increased to a gale. It shifted very quickly to northwest, when hail commenced falling, and again back to southwest and south, leveling trees and fencing. After shifting to south, a railroad bridge, three hundred feet in length, was raised from its piers and thrown into the river. Blacksburg, Va., was visited about noon of the 10th by a heavy and terrific rain and hail-storm, which was very destructive to property. During the heavy rain-storm in New Jersey, on the 11th, a "whirlwind" passed from south-southwest to north-northeast in South Orange, with a track about two hundred feet in width. Barns were blown down and trees uprooted and broken off. Corn-fields presented the appearance of a heavy roller having passed over them. From 9 A. M. to 2:30 P. M., 5.10 inches of rain fell, which caused the streams to overflow and become destructive. A violent tornado passed about two miles south of the village of Hutchinson, Minn., on the evening of the 25th. Houses, &c., in its path, were destroyed. Bundles of grain were carried a

distance of nearly a mile. At Vicksburg, Miss., a very violent thunder-storm occurred on the 5th. The wind shifted to north and northeast, and attained the velocity of forty miles per hour. On the 14th, at Corsicana, Texas, during the heavy thunder-storm the lightning was fearful, and 3.90 inches of water fell. The creeks overflowed their banks and carried away houses, &c. Spartanburg, S. C., was visited on the same date by a severe wind, rain and hail-storm, damaging buildings and crops.

United States steamer Rio Bravo encountered a heavy southerly gale during the night of the 13th, fifteen miles from Sabine light, on the coast of Texas. The vessel was badly damaged and run ashore. A schooner was struck by lightning on the 16th off Sandy Hook, N. J. Off Chatham, New Brunswick, a schooner was damaged by a whirlwind.

TEMPERATURE OF THE AIR.

The isothermal lines for the month appear on Chart No. II, while in the left-hand lower corner of the same is a table giving the average temperatures, by districts, for the month. In all the districts, excepting New England, the weather has been cooler than usual, especially from the Gulf coast to the Upper Lake region and the Northwest. The difference is greatest in the upper Mississippi and lower Missouri valleys. It has been slightly warmer than August, 1873, in New England and eastern New York, but otherwise generally cooler. Compared with August of last year, the temperature averages a little higher in New England, eastern New York, New Jersey and on the Pacific coast. In the other sections it averages lower, especially in the Southwest, where the difference is as much as 8°. The following are the minimum temperatures for the several districts: Escanaba, 38°; Pembina, 26°; Pike's Peak, 24°; Cleveland and Buffalo, 48°; Mt. Washington, 28°; Burlington, Vt., 46°; New York, 55°; Wytheville, Va., 48°; Charleston, 67°; Bismarck, D. T., 39°; Virginia City, M. T., 33°; Dubuque, 41°; St. Louis, 55°; Memphis, 63°; Corsicana and Shreveport, 64°; Montgomery, 65°; Key West, 73°. Maximum temperatures—Bismarck, 91°; St. Paul and Dubuque, 90°; Milwaukee, 89°; Erie, 87°; Mt. Washington, 61°; Burlington, Vt., 87°; Portland, Me., 90°; Wood's Hole, Mass., and Newport, 81°; New York, 90°; Wilmington, N. C., 92°; Key West and Augusta, Ga., 91°; Jacksonville, 95°; Montgomery, 94°; Shreveport, 104°; Nashville, 89°; Louisville, 88°; Leavenworth, 90°; Denver, 96°; Pike's Peak, 55°. The greatest range of temperature (59°) was at Pembina, D. T., and the least (18°) at Key West.

Frost.—Light frosts were reported to have occurred on the 1st in northeastern Pennsylvania; the 19th in Iowa; 20th in Ohio; 23d, 24th and 25th in New York; 27th in New York, Pennsylvania and Wyoming Territory; 28th in Iowa; 29th in Minnesota; heavy and destructive frosts on the 21st in Minnesota; the 22d in Illinois, Iowa, Michigan, Wisconsin and Minnesota; the 23d in Wisconsin, Michigan, Iowa, Illinois, Indiana and Ohio. Some of the above have been spoken of in connection with the movement of areas of high barometer.

PRECIPITATION.

Chart No. III shows the distribution of the rain-fall. The table upon the same, giving the average by districts, furnishes the means of comparing it with the average for years. It shows that the precipitation has been above the average, excepting in the St. Lawrence valley, Tennessee and the Ohio valley, and on the Pacific coast. The very large excess in the Middle Atlantic States is due principally to the storms of the 2d and 3d; the 7th; 11th, 12th and 13th; and the 17th and 18th. The rain-fall has also been heavier than for August, 1874, in the St. Lawrence valley, Middle Atlantic States, South Atlantic States, East Gulf States, West Gulf States, Lake region, upper Mississippi and lower Missouri valleys and Minnesota.